

REMARKS

Applicants appreciate the Examiner's thorough examination of the present application as evidenced by the Office Action of June 5, 2003 (hereinafter "Office Action"). In response, Applicants have amended Claim 1 to include the recitations of Claim 7, which has been canceled without prejudice or disclaimer. Claims 8 - 11 have been amended to correct their dependencies in light of the cancellation of Claim 7.

✓ Applicants respectfully submit that the cited references fail to disclose or suggest, among other things, "adsorbing the metal precursor in the lower electrode" as recited in amended independent Claim 1. Therefore, Applicants respectfully submit that all pending claims are in condition for allowance. Favorable reconsideration of all pending claims is respectfully requested for at least the reasons discussed hereafter.

Information Disclosure Statement

Applicants submitted a Supplemental Information Disclosure Statement on January 16, 2003. Applicants respectfully request the Examiner to return an initialed copy of the PTO-1449 form that accompanied the Supplemental Information Disclosure Statement in the next correspondence from the U. S. Patent and Trademark Office.

Independent Claim 1 is Patentable

Independent Claim 1 has been amended to incorporate the recitations of dependent Claim 7. Dependent Claim 7 stands rejected under 35 U.S.C. §103(a) as being unpatentable over U. S. Patent No. 6,207,489 to Nam *et al.* (hereinafter "Nam") in view of U. S. Patent Application Publication No. US 2002/0006708 to Kang *et al.* (hereinafter "Kang"). Independent Claim 1 is directed to a method of forming an integrated circuit capacitor in which a metal preprocessed layer is formed on a lower electrode. More specifically, Claim 1 includes the following recitations directed to forming the metal preprocessed layer:

placing the substrate into a reaction chamber;
adsorbing the metal precursor in the lower electrode;
reacting the metal precursor with the lower electrode; and
purging the metal precursor from the reaction chamber;...(Emphasis added)

In rejecting Claim 7, the Office Action states that Nam discloses "adsorbing the metal source gas Ta or Ta(OCH₂H₅)₅ in the lower electrode..." Applicants respectfully disagree with this interpretation of Nam's teachings. As illustrated in FIGS. 5B and 5C, Nam discloses the formation of a pre-treatment film 22 on the surface of the lower electrode 20. This pre-treatment film comprises one or more of SiN_x, SiO_x, and SiO_xN_y. (Nam, col. 7, lines 1 - 9). Accordingly, in sharp contrast with the recitations of Claim 1 as amended, the Ta precursor 25 shown in FIG. 5C of Nam is not adsorbed in the lower electrode 20 because the pre-treatment film 22 is disposed on top of the lower electrode 20. Applicants note that adsorb means to adhere in an extremely thin layer of molecules to the surfaces of solid bodies or liquids to which the molecules are in contact. The pre-treatment film 22 prevents the Ta from contacting the lower electrode 20.

Applicants further submit that Kang fails to provide the teachings missing from Nam. With reference to FIG. 1, Kang explains that an oxide film (SiO₂) is disposed on a conductive layer and "does not absorb a metal deposited to form a selective metal layer..." (Kang, paragraph 34). Thus, in sharp contrast with the recitations of Claim 1 as amended, the oxide film disclosed in Kang prevents the metal layer from adsorbing in a lower electrode.

For at least the foregoing reasons, Applicant respectfully submits that independent Claim 1 is patentable over the cited references, and that dependent Claims 2 - 6 and 8 - 23 are patentable at least by virtue of their depending from an allowable claim.

Dependent Claims 13 - 20 are Separately Patentable

Applicants further submit that dependent Claim 13 is separately patentable for at least the reasons discussed above with respect to independent Claim 1 because the cited references fail to disclose or suggest forming a metal oxide layer by "adsorbing the metal source gas in the lower electrode." Thus, Applicants respectfully submit that dependent Claims 13 - 20 are separately patentable for at least these additional reasons.

CONCLUSION


In light of the above amendments and remarks, Applicants respectfully submit that the above-entitled application is now in condition for allowance. Favorable reconsideration of this application, as amended, is respectfully requested. If, in the opinion of the Examiner, a

In re: Chung et al.
Serial No.: 10/043,027
Filed: January 9, 2002
Page 7 of 7

telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at (919) 854-1400.

It is not believed that an extension of time and/or additional fee(s)-including fees for net addition of claims-are required, beyond those that may otherwise be provided for in documents accompanying this paper. In the event, however, that an extension of time is necessary to allow consideration of this paper, such an extension is hereby petitioned under 37 C.F.R. §1.136(a). Any additional fees believed to be due in connection with this paper are hereby authorized to be charged to our Deposit Account No. 50-0220.

Respectfully submitted,




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CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to Mail Stop Non-Fee Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on September 4, 2003.



Traci A. Brown